

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

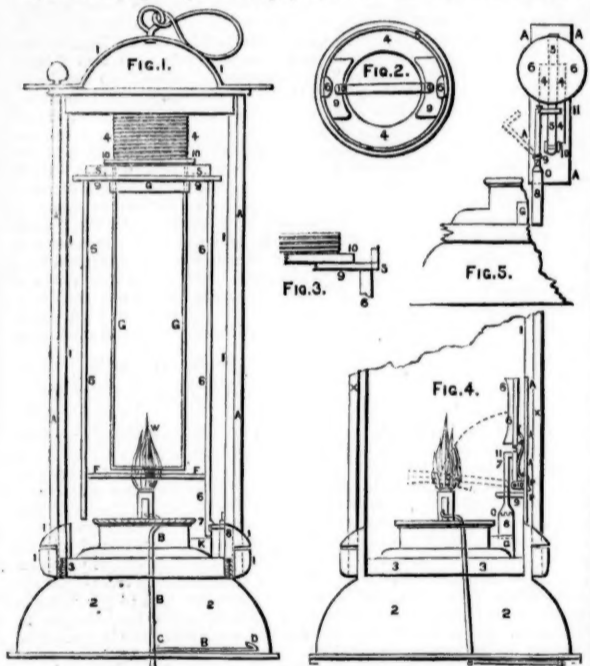
NEW SAFETY-LAMP—THE "MINERS' FRIEND."

SIR,—The awful explosions both in English mines and those on the Continent, many of which have been caused by miners opening their lamps, either to get more light for their work or to light their pipes, set me thinking whether a lamp might not be made which would embrace all the elements of the present safety-lamp, and add another, which would take it out of the power of a miner to blow himself and fellow-workmen into eternity. After trying various plans, I hit upon the two enclosed; they are equally effective, but I rather prefer the one with the lateral spring, as it does not interfere with the column of light and smoke. I fully believe that if the use of lamps of this sort was made compulsory in mines many hundreds of lives would be saved, and many hundred thousand pounds worth of property escape destruction every year.

You were kind enough to insert a letter of mine last June, in which I stated that "I had invented a safety-lamp." I have been working away at it since June, and believe that I have now made it perfect. The increased cost of the lamp would be very trifling, as I do away with the lock—the act of screwing up the lamp locking it and putting it upon a hair-trigger: the first attempt to unscrew the lamp letting it off. At the same time it cannot be let off by accident; you may do anything you like with the lamp, except attempt to open it, and not put it out. I take a large size gauze-lamp (Davy's) to place any safety in; it is trimmed from the outside, as in the present lamp, the wick-trimmer being jointed and doubling up underneath the lamp.

MATHEW H. GILMORE,
Commander Royal Navy.

1, Charlotte-square, Edinburgh, Oct. 18.



In the above diagrams, Figs. 1, 2, 3, refer to the first form of lamp. 1, is the outside of lamp; 2, oil-holder; 3, part of oil-holder which screws into lamp; 4, spiral-spring (accumulated); 5, disengaging-ring; 6, disengaging-rod; 7, shoulder on disengaging-rod, which is held up by, 8, projection on inside of lamp; 9, supporting-quadrants connected with rings (4), and rod (6), and underneath cross-head (10), which is underneath spring (4), keeping the spring compressed as in drawing, pushing up on rods (6, 6), which are connected with ring (5) and quadrants (9), which again-take under the cross-head (10), the spring is compressed. You then place the notch (7) over projection (8), which holds it up. On screwing the oil-holder into lamp, just as the last turn is being taken the liberating wing (K) catches the end of rod (6), and throws it off the projection (8), the rod falling behind wing (K), of course in attempting to unscrew lamp, (K) takes rod (6), which has dropped down, the reverse way, and turning it and all connected with it (viz., 3, 5, and 7) round, throws quadrants (9) from underneath cross-heads (10), releasing spring (4), which flies down and presses and keeps pressed extinguisher (Q) on wick (W), extinguishing it immediately. A, rods connecting and supporting upper and lower parts of lamp; B, wick-trimmer, which being jointed at C is turned underneath oil-holder and hooked up at D until wanted; E, position of B when unhooked; F, lower ring connecting rods G; G, guide-rods to lead extinguisher down fair on to wick; H, ring connecting rods G. By this means it is entirely out of the miner's power either to open the lamp to give himself more light, or for the purpose of lighting his pipe, without causing its instantaneous extinction; thus preventing the selfish act of one man not only causing his own death, but, as has frequently been the case, the death of hundreds of his fellow-miners; the consequences being the hurrying of these souls into eternity, the misery and poverty of the murdered men's (the "bread-winners") belongings, the closing of the mine, and the throwing out of work of the hundreds who depend upon it for their living. Make the carrying of lucifer matches into a mine, or even the possession of them whilst going to work a penal offence, use self-extinguishing lamps, and the mining obituary will tell a very different tale, and the newspapers will not have to relate "awful explosion at Ferndale, loss of 86 lives;" or publish similar mining horrors to the world.

Figs. 4, 5, refer to the second form of lamp; 1, are the sides and outside parts of lamp; 2, oil-holder which screws into lamp (four turns); 3, screw; 4, spring—accumulated; 5, extinguisher-carrier, pivoting at 10; 6, extinguisher; 7, hold-back, pivoting at 9; 8, let

go, a continuation of 7, hinged at 0, but the hinge only allowing it to swing one way; 9, hold-back pivot; 10, extinguisher-carrier pivot; 11, catch of hold-back; A, strengthening-plate on outside of lamp to plant the work on at P; G, wing or projection on oil-carrier; F, ends of pivots secured and planted on A; X, rods supporting lamp and forming its frame-work. The wick being lighted, the oil-holder is screwed into the lamp; in screwing in the wing (G) comes into contact with the let-go (8), but the let-go swings (at 0) and allows it to pass, and the lamp is screwed up; but on the attempt to unscrew—i.e., open the lamp—the wing takes the let-go in the reverse, and it will not yield, and throws back the hold-back (7) and catch (11), so releasing the extinguisher-carrier (5); the spring 4 comes into play and presses the extinguisher, which is weighted on to the wick, on which it presses whilst the lamp is being unscrewed, totally extinguishing the lamp. By this means it is entirely out of the miner's power either to open the lamp to give himself more light, or for the purpose of lighting his pipe, without causing instantaneous extinction.

THE VENTILATION OF MINES, AND SAFETY-LAMPS.

SIR,—In the agitation now going on in several of the colliery districts in the kingdom there is a new and noticeable feature, which ought not to be passed over unobserved, seeing that it shows that the mining body has now become more fully alive to all that relates to the safety of those working in our collieries than was formerly the case. Not only has the question of improved ventilation become a platform one, but the men have taken it up, and warmly discuss it in all its bearings, and appear to look forward to Imperial legislation for affording to them greater security than at present exists. It is contended by the leaders that most of the explosions which have taken place of late years, involving such serious loss of life, were preventable, and in this they are borne out to some extent by the reports of the Government Inspectors of Mines. Such being the case, it has been urged, and with considerable force, that every possible guarantee should be obtained, and every precaution enforced, for securing to those engaged in mining pursuits the greatest amount of safety, and that by legislative enactment. Mr. Normansell and others of the leaders assert boldly that the safety-lamp has often been a curse to the miner, causing him to believe in the infallibility of that charmed invention, and that so long as he had one with him he was free from all danger. This all persons connected with mines will, to a large extent, admit, for there can be little doubt but what too great faith placed in a lamp has led to serious and appalling disasters. It is also considered that there can be no actual safety with a lamp in places where the atmosphere is such that a naked light would lead to an explosion, hurling, perhaps, hundreds to instant death, seeing that there many ways of an accidental character by which the lamp might be so injured as to expose the flame. Working with the dismal light on the floor, and in all but total darkness, a blow with a pick soon destroys a part of the fine cobweb-like network of the lamp. The gas "fires," as it is termed, in a moment the whole of the workings are in a blaze, sending with all the force of the explosion of a well-stocked powder magazine everything within reach for hundreds of yards to destruction, and making the very earth to tremble. Mr. Normansell asserts that no man should be compelled to work in a place where there was gas, which was not only detrimental to his health, but which from some accidental circumstance might become ignited. The same view is entertained by the working miner; and although it may be said that they are not required to do so, yet the colliers say, if there is not fire-damp in their working places, why should such great precautions be taken in working with a safety-lamp, and to prevent its being tampered with? That is considered a proof in itself that gas very likely is in his working place, that the man is working where it is injurious to his health, and that the atmosphere is such as may lead to his own destruction as well as of those around him. Mr. Normansell, in his evidence before the Trades Union Commission, which has been printed, and is now being extensively circulated amongst the miners of Yorkshire, with regard to the safety-lamp, says:—

"If the safety-lamp is a protection in one way from danger it is, perhaps, dangerous in six other ways in bringing on injuries and loss of life. I have been brought up in and about mines all my life, and my experience is that the Davy lamp is no safety-lamp at all. I believe that what are termed safety-lamps have destroyed more lives than they have really saved. Very often the lamp being in existence is the very cause of the danger existing, because there is no reliance placed in the lamp there would probably be no need for it in those cases, because the danger would be removed. I have known scores of instances where the ventilation has been seriously neglected, and they have relied entirely on the lamp. We are never safe now, according to the theory of the mining engineers. Eruptions may so suddenly come upon us that we are never safe in the best ventilated mines we have in the country, because it has been frequently said in South Yorkshire (which is one of the most fiery districts in the country) that it is an outbreak. If an explosion takes place, all the talent is brought to bear to trace it to an outbreak—something that could not really be prevented or provided for. I am not condemning the safety-lamp, but what I say is, it is my opinion that scores of accidents and explosions have taken place solely on account of depending on the safety-lamp, instead of depending on proper ventilation. The safety-lamp is all very well in its place—in fiery mines, for the purpose of going and examining places every morning before the workman commences work—for going into goaves where the coal has been got. When there is gas anywhere in pits, even if there are safety-lamps, a man has no business there at all. Where there is not good ventilation a human being has no right at all. I say that lamps have been relied upon too much; they have been placed in mines instead of more shafts and thorough ventilation. The Davy lamp will explode if you allow the gas to be in it a few seconds; but our managers prefer going round with one to examine working places, as they can detect the gas much better with it than with the Stephenson lamp. I have worked with a Davy lamp until it became red-hot, before I had that experience that I ought to have had. They are mostly dangerous mines with us in South Yorkshire, but with good ventilation I believe that they will not be dangerous, so far as gases are concerned."

Such are the views entertained by the leading man amongst the miners of Yorkshire, and such no doubt are the views of the mining body generally. Some of the Government Inspectors of Mines, it would appear, have also considered that lamps were used where gas was to be found, for about two years ago, or rather more, a majority of them recommended the adoption of a new General Rule—"In all workings in coal where safety-lamps are used as the means of lighting, no blasting powder shall be used in such mine." The rule was objected to by Mr. Atkinson, on the ground that it would tend to cause mines to be worked with naked lights, in order that blasting might be employed. Mr. Dickinson, in one of his reports, in speaking of choke-damp, also states that when candles go out it is a plain warning that a man would not last long, and to be harmless there should not be as much carbonic acid gas in any mine as would dim the burning of a candle. Looking at the ventilation of mines alone, Mr. Brough says a fiery colliery cannot be worked profitably with meagre and insufficient ventilation. Abundance of air is economy,

and its skilful distribution essential. A pit should be kept night and day in a uniform and efficient state, as by that means alone can it be depended upon, and so explosion prevented. The same gentleman also states, with regard to experiments made some time since with safety-lamps, when some of them showed such facility and quickness in passing the flame through the gauze—

"If these experiments are to be relied on, and the lamps we place in the colliers' hands (long thought to be vested with safety) turn out to be vehicles capable of communicating flame to a surrounding fiery atmosphere, then, indeed, increased vigilance, or some improved system of lamp, will clearly be required."

It has been proved that since the introduction of safety-lamps the explosions have been far more fatal than they were before. This has been attributed by Mr. Wales, to some extent at least, to the fact that under the old system—

"The whole of the abandoned 'bords' or 'stalls,' or other excavations, were constantly swept by a current of air being coarsed through them. Every old stall or heading acted as a wind-way to support which it was necessary to leave pillars of coal, which in all probability formed 50 or 70 per cent. of the whole; and all this coal was sacrificed for the sake of the principle of coarsing the air. By the use of the lamps collieries that were considered exhausted have been reopened, and large quantities of coal safely worked."

The principal receptacles for gas, it may be said, are the goaves, and not long since we heard an eminent mining engineer state that their ventilation had been far too long neglected; that what was termed ascensional ventilation, he believed, or gasdrainage, was quite practicable, as there were means by which the gas might escape and find its way to the surface. There is very little doubt but what the present system of ventilation is capable of some improvement, and although we have very little faith in anything in that direction being brought about by Act of Parliament, still it is worth the while of our scientific and practical men to adopt every means having for their object the ensuring of a tolerable healthy place for the miner to work in, and giving him greater confidence as to his safety whilst pursuing his by no means pleasant employment.

NOTES ON THE WARWICKSHIRE COAL FIELD—No. III.

SIR,—In No. II. article I suggested the importance of the Warwickshire coal field being transformed from a semi-black country to a real one, with its teeming population of busy workers in mine and forge; its glaring fires betokening extensive manufacture of other "pigs" than those of which the farmers boast—its countless chimneys as so many monuments telling the same tale of "something attempted, something won." Some of our readers may read and smile at the fanciful scene here pictured. Well, it is good to have an imagination, and it is good to find it wholesome material with which to build its "bridges of fancies." In this particular case we not only have the fanciful picture, but we can tell of the existence of those essentials requisite to transform with magic skill the fanciful into the real. Let us, then, again enquire into these essentials, which certainly are, sooner or later, doomed to change the existing scenes and prospects.

By geological examination of the district, it is found that the total thickness of coal measures, from the base of the Permians to the top of the Millstone Grit, is about 3000 ft., the lowest productive bed of coal being about 1050 ft. below the base of the Permians, according to the Geological Survey. In this thickness of coal measures, which are composed of shales, sandstones, indurated clays, ironstones, and coals, there are five acknowledged workable coals, giving a thickness of about 30 ft. of coal. These coals are very persistent throughout the coal field as to the total thickness, but vary in their respective positions, sometimes thickening, and sometimes thinning, as will be seen from the following sections:—

	Hawkesbury.	Bedworth.	Griff.	Baddesley.
FOUR-FEET COAL	69 0	61 0	49 2	49 2
INTERMEDIATE STRATA	6 8	6 0	6 0	6 0
TWO-YARD COAL	5 0	4 0	2 0	8 6
RIDER COAL	5 7	4 0	2 0	0 9
PARTING	1 0	16 0	4 2	5 6
BARE ELL COAL	6 10	7 0	10 0	4 6
INTERMEDIATE STRATA	39 7	60 0	84 0	...
SEVEN-FEET COAL	4 6	5 0	5 9	5 6

In addition to the above, the following section will be interesting to your readers, inasmuch as it gives an account of strata sunk through near Hawkesbury basin, which has proved measures deeper than in any pit in the neighbourhood. It commences from the Seven-Foot Coal, which is the deepest workable coal:—

No.	Description.	Ft. in.	No.	Description.	Ft. in.
1.	SEVEN-FEET COAL.....	4 10	22.	COAL	1 0
2.	Fire-clay.....	11 6	23.	Fire-clay.....	6 0
3.	Black sand.....	3 0	24.	Binds.....	5 0
4.	Fire-clay.....	8 25	25.	Fire-clay.....	1 10
5.	COAL.....	1 6	26.	COAL.....	2 5
6.	Sandstone (with water) ..	20 8	27.	Bind and ironstone balls..	10 6
7.	Sandstone.....	7 0	28.	Grey rock and binds.....	3 7
8.	Fire-clay.....	8 0	29.	Ironstone band.....	0 4
9.	Black sand.....	1 0	30.	Brown rock.....	2 8
10.	COAL.....	0 3	31.	Black loose sand.....	1 2
11.	Fire-clay.....	4 6	32.	COAL.....	1 4
12.	Ironstone balls.....	1 0	33.	Bind and ironstone band..	12 4
13.	Binds.....	19 9	34.	Ironstone.....	2 0
14.	COAL.....	2 0	35.	Bind and ironstone bands..	14 3
15.	Fire-clay.....	9 0	36.	Black shale rock.....	0 6
16.	COAL.....	3 0	37.	White rock binds.....	1 6
17.	Fire-clay.....	2 0	38.	Black binds.....	42 0
18.	COAL and batt.....	2 0	39.	Alternations of hard black batt and granite, like rock in boulders.....	172 9
19.	Fire-clay.....	4 0			
20.	Black ironstone balls.....	2 0			
21.	Black batt.....	1 0			

It is given by the authorities of this section that No. 20 is a newly-found ironstone, containing 45 per cent. of iron, and yielding 9 cwt. per yard. This same ironstone is now being worked in several collieries, and is certainly rich in yield and produce. It has been proved to extend right through the coal field, along its outcrop. Near Oldbury, I picked up a piece of this black ironstone out of the spoil-banks made by the getting of ironstone in "bell-pits" in days of yore. Not far from this estate it has been proved to exist in its usual richness. To give a rough idea of the amount of ironstone available for use in this coal field, we may, with an amount of certainty, calculate upon the white and black ironstone existing under an area of eight miles in length by one in breadth, and yielding 9 cwt. per yard. This would represent the enormous quantity of about eleven million tons, which would produce four and a-half million tons of iron for each measure. There are other measures of ironstone which would, doubtless, be profitable if they could be smelted on the spot, which would materially augment these quantities. Some consumers in the Black Country do not give these ironstones credit for yielding so much as 40 per cent. of iron. According to analyses made by the bicromate of potash method and the permanganate of potash method

we find a result of 40 and 42 per cent. Dr. Percy gives a detailed analysis of a piece of ironstone from the neighbourhood of Bedworth, but does not state whether it was white or black ore. It contained—

Protoxide of iron	48.70	Carbonic acid	36.89
Protoxide of manganese	0.90	Phosphoric acid	0.71
Alumina	0.50	Water (hygroscopic combined)	1.15
Lime	3.25		
Magnesia	3.05	Total	100.0
Silica	4.85	Iron, total amount	37.88 per cent.

These percentages of iron contained in the Warwickshire ironstone are not only found in the laboratory, but are attested in the greater laboratories of the furnaces, where they are used.

We now can say that we possess something more than fancy—we have figures and facts. The one essential—iron ore—is proved beyond the shadow of a doubt to be as rich as the average of the South Staffordshire ores, and to be in plentiful store. The coals are in the "dark cellars," and cannot be said to have been so thoroughly proved as being valuable for smelting purposes; but we do know that they have been successfully consumed for manufacturing iron, and we have no doubt of their being in sufficient quantity and quality to smelt iron with. If the objector says that they contain more than the average quantity of sulphur in their composition, either in the shape of FeS, or combined, I can point to coals being consumed in the blast-furnaces containing more S than a part of the Warwickshire coals, and that profitably. If the objector thinks part of them too tender, I can remind him it is now being found that there is no advantage in having exclusive large coals, but that small coals work to better advantage in the furnace, from the fact that the fuel gets more equally distributed amongst the materials in the furnace. If the objector believes a part of the coals are too hard in their nature, I refer him to the modern improvements in the blast-engines, increase of heat of blast, and, in fact, to the general improvements in the *modus operandi* of furnace working. This important question ought to be examined fairly and closely in all its *pros* and *cons*, and then for those who would be directly interested in the change to devise some sensible scheme for maturing a suggestion into something tangible.—*Willenhall, Oct. 18.* T. PARTON, F.G.S.

THE SOUTH STAFFORDSHIRE AND SHROPSHIRE COAL FIELDS—No. XX.

SIR,—In the course of these letters, which I now bring to a close, I trust sufficient evidence has been adduced to show that great caution is needed in experimenting for coal east and south-east of the Shropshire coal field; also to make it appear that my aim was not to discourage legitimate enterprise, but to check ill-considered schemes, arising out of ignorance or selfishness, and likely to lead to the expenditure of large sums of money uselessly. One argument may be added to those previously given—the lapse of time needed for the change evident on passing from the older coal measures to the Permian rocks. It has already been shown that such a break existed between the Silurians and the coal measures; it is quite certain, as well from stratigraphical evidence as from Palaeontological facts, that such a gap exists on passing from the old coal measures to the Permians, from the very circumstance that not more than 15 per cent. of the fauna of one is common to the two epochs. It is no less true that such a pause occurred between the Permians and the Bunter, and that a like lapse of time took place between the formation of the latter and the Keuper, from the fact that 10 per cent. only of species common to the one is to be found in the other. Continuity of strata, such as prevailed during the old coal measure deposition, becomes the exception rather than the rule on rising into the red rocks; unconformability is everywhere most striking, elevations and depressions appear to have taken place, denudation to have set in, and new conformations to have presented new coast lines, which were washed and wasted in turn. It is true the coal measures graduate at times into the Permians, but it is always the upper members, and we have seen that it was not till after the older group had been denuded by slow processes that these were formed, sometimes over their broken edges, and sometimes on the foundation rocks from which they have been swept. These consist of a series of red clays and, comparatively speaking, worthless coals, and even these had been very extensively denuded around the Staffordshire and Shropshire coal fields before the Permian rocks were formed, hence they are consequently unconformable in most cases. The pause between the formation of these stratified rocks was so great that several species died out, the atmosphere cooled down, the rank vegetation which distinguished the coal period ceased, and very altered conditions prevailed. The old notion of the sudden destruction of the fauna of one period, and distinct creations of others in succeeding ones, to account for such breaks is no longer tenable or entertained, the percentage of animals and plants belonging to one, two, or more such epochs having completely undermined it. Again, these Permians are found filling up hollows made by denudation; they are thickest where wash and waste have been greatest, and thinnest where they wrap over the least denuded portions of the coal measures: from some 200 feet thick above the coal measures they increase as they recede south-east to 400, and from that to 1500 feet, where the trough of the basin may be supposed to have been.

On the Wolverhampton side the same evidences of denudation are visible. Fragments of coal, both angular and rounded, similar to those on the Shropshire side are found, coals untouched in one locality are missing altogether in another, and 1000 ft. of younger measures, piled up on the older ones in one place, have been cut down, and carried away in others. Thus in both fields there was a wearing away of the old coal measures, then the formation of new; thirdly, a denudation of the two together; and, fourthly, the formation of the Permians, which filled up the hollows denudation had made. At the Earl of Dartmouth's pit, at West Bromwich Heath, there were 806 ft. of Permian rocks, but even these did not include the whole, whilst in other instances they did not even cover the higher portions of the older formation, or else were themselves denuded, for we find the New Red Sandstone resting on the upper coal measures without any intervening Permians whatever at Brereton and Rugeley, where shafts pass directly down from the conglomerate of the Bunter to the coals. Again, if we cross the Trent, and go to the Leicester coal field, we find at times not only the Permians but the Bunter absent, or only sparingly represented, and shafts sunk through the Keuper marl coming down upon the coals. Whether it was the experience of the gentleman, who is now boring for Mr. Corbet, gathered in this (the Leicester) field, which led him astray or not, I cannot say, but it may without egotism be remarked that if I had been called in when these borings at Child's Ercall were commenced, he might have been saved some 300 feet of unnecessary strata, and his employer more than 500*l.*, by distinguishing by means of local knowledge between the Bunter and the Permians, both of which are known to exist on this (the Shropshire) side. I know the difficulty there is in distinguishing the characteristic features of the Permian and Bunter; the lithological difference is sometimes vague, but here both are upon the surface—the well-known conglomerate, with its water-worn, liver-coloured quartz, and other pebbles, with fragments of the Caradoc, Wrekin, and Llandovey hills, and a drift gravel let loose therefrom, and within a short distance (perfectly horizontal at Crow Lane) are the Permians, with their familiar calcareous breccia on the banks of the Tern.

This very remarkable breccia, a word used to designate strata formed of angular pebbles in distinction to others water-worn, and which Prof. Ramsay, from others to which they bear strong resemblance, considers to have been spread over the sea bottom by means of floating ice, serves to confirm the view taken of the great change which came over the climate between the period of its formation and that when the coal flora flourished. The same breccia (with plants of the same colour as the clay) are to be seen in a yellow sandstone at the Hay, near Coalport; at Enville, where borings have been made to a great depth without coming to the coal measures; at Arley, near Bewdley, where 454 yards of the younger coal measures were gone through without meeting with more than one workable coal, and in the Shrewsbury fields. On this, the Shrewsbury side, they are not of any considerable thickness; at Welbath they are not more than 30 yards; at Uffington they are about the same, but they can be traced from the Shrewsbury coal field to Wrexham and Denbigh. In the North Staffordshire coal fields, where they consist of red and purple sandstones, marls, and oolite-stone (with plants), they are 200 yards, in addition to certain brown sandstones of the upper coal measures.

Of the thickness of the Lower Red or Mottled Sandstone of the Bunter it is difficult to speak, it varies so much in different places. On the Wolverhampton side of the Shropshire field (at Grindle) it is 160 ft. thick, and on that of Lancashire Mr. Hull gives it a thickness of from 355 to 650 ft.; but in some instances, as we have shown, it is absent altogether. I believe, however, notwithstanding the mistake that has been made by going through 300 feet of unnecessary strata, that the coals at Ercall will be found at a reasonable depth. Since my last letter, and since sending in my report of these borings to Mr. Corbet, I have received a letter from that gentleman, which bears me out in the opinions I had arrived at, and which I had expressed in the *Mining Journal*. He says he took the late Dr. Buckland to see the outcrop of Permians with the breccia above described, and he exclaimed immediately—"You are on the coal, and not far from it." Mr. Corbet tells me that Mr. Selwyn, then on the Government Survey, Dr. Lloyd, of Birmingham, and other well-known geologists, including, I believe, Professor Phillips, of Oxford, and Mr. Etheridge, of the School of Mines and Museum of Economic Geology, Jermyn-street, have all pronounced favourable opinions with regard to these borings.

If the thickness of the red rocks should prove to be serious, it is to be hoped either that the neighbouring landowners, whose estates will be increased in value supposing coal to be found, or the Government will come forward and assist in an undertaking intended to solve a problem of such great interest and importance to a very large district.

In bringing these letters to a close, allow me to say that as I have been requested to publish them in a separate form I purpose doing so, after re-writing them, so as to bring the facts closer together, and adding others equally bearing upon the question. I think this may be done, with some few simple illustrations, for a sum not exceeding 5*s.*; and if you, Mr. Editor, will be kind enough to receive the names of any who might be disposed to favour me by becoming subscribers I shall feel obliged.—*Madeley, Oct. 18.* JOHN RANDALL, F.G.S.

DENUATIONS, AND PROPOSED VENTILATION OF MINES.

SIR,—In my letter on facts of the Sand and Gravel Formations, which appeared in the Supplement to the Journal of Sept. 18, I drew attention to the fact of the sand and gravel being in regularly superposed layers, more especially the former; and that going downwards the wealden, oolite, &c., are no less instructive, their strata being similarly disposed.

On reference to p. 375 of Darwin's "Economy of Vegetation," of 1799, will be seen a section of the strata to the low main coal at St. Authon's colliery, at the top of which is soil and clay 30 ft.; then brown post, 72 ft.; coal, 8 in.; blue metal stone, 17 ft.; white girdles, 13 ft., and so on of regularly defined layers down to the low main coal of 6 ft., at the depth of 135 fms.

Mr. Randall, in No. XV. of his letters on "The South Staffordshire and Shropshire Coal Fields," in the Supplement to the Journal of Sept. 18, states that Mr. Boulbee, at Chatwell, went down 1884 yards through New Red Sandstone strata, "consisting of 27 ft. of calcareous conglomerate and sand rock, 100 ft. of brick-red sandstone, 100 ft. of brown and red sandstone," &c.; but on reference to the actual details of Mr. Boulbee's borings, it will be seen that the first 100 ft. consist of white and red shale, red rock, white rock, dark rock, &c., in regularly superposed layers of from 1 to 19 ft. in thickness, whilst a little lower down are the motley rock, bull's liver, white clod, dark red loam, red slum, &c., of from 4 ft. to 9 ft. in thickness—in fact, affording the most conclusive evidence that at the period of the deposition of those strata, their formation was not disturbed by the slightest motion. Mr. Randall's sections of 1868, of the Shropshire coal fields are no less interesting; and Mr. E. Heydelbach Davis, in his letter in the Supplement to the Journal of September 18, on the "Mineral Wealth of Portugal," shows that the stratification in that country is not only equally well defined, but also that in the Chao Preto coal field there is a most strange formation of alternating layers of clay and coal, each of only a few inches in thickness.

The above, then, are the facts of the case as regards stratification, and if I understand Mr. Randall correctly, supposing A B C to represent a coal measure, and B should be clay, and not coal, then B has been washed away and replaced by clay; but in formations of a much later date we have evidence, and that the most conclusive, that materials, such as sand and clay, have accumulated in distinct formations within a few yards of each other, a narrow lane only, in fact, separating the two, and at Mopley the formation is sand, with, however, large deposits of clay, although at a village only three miles to the south-east, it is clay; whilst, as I have already observed, in many of the sand hills at Mopley there are beautifully well-defined layers of clay, apparently separating one period of formation from the others, and in others the clay, although but a mere film, may readily be separated from the sand with a knife, clearly showing that there were conditions which kept one formation distinct from the other.

Mr. Randall assumes that large portions of our coal measures have been swept away, but Staffordshire and Shropshire are well inland, and if the geology of the land in the direction from which the supposed wave came be as old as that of the parts "denuded," a body of water, capable of removing 1000 ft. of vertical strata, with a sloping shore of 5000 ft., could not otherwise than have considerable influence on the land over which it passed. Will, then, Mr. Randall be so good as to state what is the condition of that land? and "as the crust of the earth, leaving out of consideration sedimentary deposits, has been consolidated by cooling, its formation must have taken place from without inward" (the accepted doctrine), how, in accordance with that doctrine, the body of water capable of producing the effects he describes, could have existed at so early a period as that of the coal bed formation? And as many of the strata of the coal bed formation are of solid rock, it remains to be shown how those rocks could possibly be formed in an estuary from materials supplied by rivers or the sea, it being patent that neither lime, clay, nor sand will combine into a hard material, otherwise than through the agency of "heat."

I intend that, on the evidence of facts, from the first of the earth's formation to its close, a perfect atmospheric quiet prevailed, and that storms and waves, which have been so vastly on the increase within the last 50 years, as the underwriters at Lloyds know to their cost, have come into operation within a very recent date, if not long after the creation of man. My own ideas, however, I leave altogether out of the question, it being, nevertheless, imperative on those who contend for the prevalence of present conditions throughout Creation, to prove by facts that formations are taking place similar to those of former ages. We are told of the Bahamas and Newfoundland banks, and of the forests of trees (of hard wood) washed down by great rivers into estuaries, but in no one instance has evidence been afforded to show even a sand formation in any respect similar to those of former periods. The vegetation is in no way similar, and the moss of the present day forms not coal, but peat.

The second part must form the subject of a future communication. *Wrecclesham, Furnham, Oct. 17.* FRANKLIN COXWORTHY, Author of "Electrical Condition."

ON FILLING UP COAL WORKINGS.

SIR,—In the Journal of Oct. 9 I endeavoured to explain to your correspondent, "A. V.," as concisely as possible the practice of filling up workings in the steam coal districts of Rhondda and Aberdare. The gate-roads being 15 yards apart, there will be a space of 12 yards wide by 60 to be filled up between them. This I stated was filled up with the small unsaleable coal, stone got from the top or bottom of the stall-roads as they are extended, and refuse got from other parts of the mine; I certainly do not state that this space is filled with small coal only. The principal refuse material for filling up is obtained from the stall-roads, levels, and headings. These roads are continually heaving up, and the cutting of the bottom in these to make proper heights from time to time is done by night-men, who convey the material into various stalls for filling up the excavations. The same principle is adopted with stall and pillar, only there is less demand for refuse material in the stall and pillar system than with long wall. "A. V." states a case where the top is allowed to fall between the pack-walls; this, I apprehend, would be where no fire-damp is produced, and there is no refuse to be stowed away. But in the Rhondda and Aberdare collieries generally the strata above the 4 ft. seam, when it falls throws out a large quantity of gas, which would be a continual source of danger if not kept up in the way I

have explained; this is the principal reason for its being systematically carried out in some collieries, but it has other advantages which may compensate for some additional expense in carrying it out. C. V.

IRON WORKS AND COAL MINING IN MONMOUTHSHIRE, THE ABERSYCHAN IRON WORKS.

SIR,—These works are situated in the eastern valley, having communication with Newport by the eastern branch of the Monmouthshire Railway; they comprise blast-furnaces, forges and mills, and extensive coal and ironstone mines. The works date from 1826, and were carried on for some years by the British Iron Company; they are now the property of the Ebbw Vale Steel, Iron, and Coal Company. The transit of materials between the Monmouthshire Railway and the works is effected by a stationary engine, which raises ore and other materials by an incline up from the railway; the produce from the works is sent down by the same means. From the top of the incline five locomotives convey materials to and from the different departments of the works, and also from the Cwm Nantddu Mines to the furnaces.

BLAST-FURNACES.—There are six furnaces at Abersychan (five in blast), 48 feet high, 17 to 18 feet in the bosh; the make of each averages about 200 tons per week, producing hot-blast iron. The gases are utilised for heating the blast-pipes and boilers. There are two blast-engines in one house (date, 1824); these are unconnected, each 90-horse power beam-engines (condensing), fly-wheel to each; another engine of equal power, high-pressure, steam cylinder placed above blowing cylinder, having a beam to actuate the fly-wheel. Three furnaces have been in blast at Pentwyn, near the Abersychan furnaces, dated 1836; these are now partly dismantled, and the blast-engine is removed. These are also the property of the Ebbw Vale Company.

FORGES AND MILLS.—There are 52 puddling-furnaces erected, three in operation, and 24 balling furnaces, supplying five mills. One large beam-engine drives two of the forge trains, one rail mill, and two other mills producing iron for rails. Another beam-engine drives one forge train and a mill for roughing-down iron for the top and bottom of rail piles. Another horizontal cylinder engine drives a mill for blooming the piles. The whole of the manufacture is turned out in rails at one mill; the make is from 800 to 1100 tons of rails per week, according to their weight. A small inverted cylinder engine is used for driving three double presses, and another engine drives two punches for punching and notching rails. There are 18 boilers for supplying the forge and mill engines with steam; five of these are fed with coal, and 13 are heated by the hot air from the balling and 26 of the puddling-furnaces. Three balling-furnaces will heat one boiler, or six puddling-furnaces. The heat from the furnaces is conveyed by a branch culvert from each to a main culvert, proceeding to a range of two or more boilers, as convenient. These boilers are all tubular, are placed in stone seating, with a stack to cause the draught for each range. Each puddling or balling furnace has a damper to regulate the draught to the culvert.

COAL AND IRONSTONE MINES.—There are four pits in operation, raising coal to the extent of about 900 tons per day; about 750 tons of this may be consumed at the works. There are two pits from which ironstone is raised only, and some raised at two of the coal pits, producing about 2000 tons of mine per month, chiefly obtained from the Bottom Vein Mine. The coking ovens are built near the top of the furnaces; they are supplied either with small or mixed coal, from the Meadow, Three-quarter, and Big veins. The ovens are of oblong shape. The coke is drawn out by means of a crab and bars pushed into a groove in the bottom of each oven, when the charge is ready to be drawn. Coke is used solely in the blast-furnaces as fuel. The mine kilns are in proximity to the coke ovens.

CWM SYCHAN PITS.—There are two oval pits, one downcast and for pumps, the other upcast, with a band in each from one engine. The pumping-engine has a 36-inch cylinder with beam, 7-ft. stroke, condensing, second motion, long connecting-rods, and two T-bobs over the pit; there are three 9-in. lifts, raising water from the depth of 200 yards at the Bottom Vein Mine. Winding-engine, two 25-in. horizontal cylinders, 4-ft. stroke, direct-acting, built in 1855; draws from the depth of 200 yards from the downcast with a wire-rope band, and from the upcast from the depth of 182 yards with a three-linked chain: the rope-rolls are of corresponding diameter. Each carriage runs on three 1/2-inch chains as guides. From the bottom of the downcast a cross-measure drift is driven west to the Meadow seam 880 yards long, intersecting in that distance the Old Coal seam, an inferior and unworked coal; the general dip of the measures is westward about 3 in. per yard. The Meadow seam is worked further to the west by a dip 800 yards long, about 600 yards down a south level is going, having 20 stalls, or more, turned out of it in a south-east direction; these stalls are single, 6 yards wide, 6 yards pillar between, and are driven 100 yards, or more, up to old workings.

SECTION OF MEADOW SEAM—CHIEF ROOF.

Coal and shale mixed	1 ft. 8 in.
Top coal	3 9
Shale band	0 1 to 2 in.
Bottom coal	2 6 to 6 ft. 4 in.
Underlay	

The cliff at top is most dangerous, from the number of bells, or pot-holes, formed in it. The coal is filled into the trams as mixed, no small, as a rule, is left underground; little gas is emitted from this coal, worked with candles, no powder used. The stall and pillar system is adopted here as most suitable to the leading features of the seam, the 1 ft. 8 in. rubbish above the coal, with the cuttings of the bottom in the stall roads and levels, serve to fill up nearly as the stalls are advanced, but timber is largely used for the support of roof; cross-holes are made occasionally from one stall to another for ventilation. The pillars when worked back are said to produce excellent coal, and the spaces are filled up with refuse material, as in the stalls. From the Meadow seam a cross-measure drift is continued further to the west about 800 yards, where the Three-quarter seam is met, and from this point levels are driven both north and south for a considerable distance.

SECTION OF THREE-QUARTER SEAM—CHIEF ROOF.

Clean coal	3 ft. 5 in.
Engine coal	0 8 sent to bank.
	4 ft. 1 in.
Rashes and engine coal	1 ft. 8 in.
Underlay	

In the north level stalls are driven out of it in a north-east direction, 12 yards wide, double roads, and 8 yards pillar of coal between. On the south side the same system of stall and pillar is adopted, but cross-headings are driven 12 yards wide, nearly full rise, with a gate-road on each side; and out of these stalls are turned to the north and to the south, of the same dimensions as the others; work with candles; no powder used. The rashes and part of the under-clay is cut for filling up the excavated parts, and rubbish is also brought from the packings of the roads in the levels, headings, and stalls, which fill up the workings quite close. On the south side there is too much debris produced from these places; the surplus is brought to the north side, where there is space for it. Men are employed at night in repairing and cutting bottom; they convey the debris into the various stalls, ready for the colliers to throw into the gob, for which the latter receive 1d. per ton on the coal. The stall-roads are supported generally by cogs, at intervals, as well as by the ordinary pillar, but the stone is unsuitable for this purpose. Gas is produced from this coal in moderate quantity; work with candles; no powder used, except occasionally in driving the levels. It is a question whether long wall is adapted or not to this seam. Mr. Green, the manager of these collieries, has tried it partially. It appears he found with that system a deficiency of material for filling up the work; this was caused by a larger demand for debris in commencing the long walls than there was with stalls and pillar, and the latter was considered the most advantageous method in that respect. But no doubt with either method the working places and filling up could be made to meet the room required for debris obtained from the neighbouring roads and levels, and with long wall an ultimate advantage gained. No difficulty is felt in the ventilation of the Three-quarter seam. An explosion lately occurred in it, caused by some men employed at night leaving a door open. The workings beyond it became fouled. These men, some time afterwards, closed the door, and turned the gas on to their lights. Four men were burnt, two fatally, the victims of their own folly.

From the bottom of the upcast pit a cross-measure drift is driven

west until it meets the Three-quarter seam. Between this drift and that from the downcast pit there is a range of about 200 yards. As an instance of the nature of the ground in these mines, these cross-measure drifts are required to be arched the greater part of their length; the arching is still being made. From the Three-quarter seam a rise stone-drift is driven to the Big seam, forming a self-acting incline about 100 yards long. The Big seam is here 8 ft. only under the Elled seam.

SECTION OF THE TWO SEAMS—Cliff roof. Elled coal... 3 ft. 6 in. Fire-clay and coal partings... 8 0. Big seam { Engine coal... 1 0, Holving clod... 0 6, Good coal... 3 0-4 6. Underlay.

The Big seam is worked by itself, on the long wall system. There are levels on each side, from the top of the incline. A cross-heading, driving out to the rise, from the north level, was examined; this cross-heading is 12 yards wide, one gate-road on each side, filled up between; 2 ft. or more of the clod above the engine coal is taken down in the roads. The stalls are turned on each side of the cross-heading, north and south, the gate-roads being 14 yards apart from the middle of each. Cogs are set up at the road-sides, to help in the support of the roof, and the spaces are filled up close with the holving, the clod from the top, and other debris obtained when the bottom is cut in the gate-roads and levels. There is no difficulty in getting material to fill up, as 3 or 4 feet of the top can be taken down for this purpose. Notwithstanding these precautions, gas is sometimes emitted in large quantities, either when a large settlement of the roof takes place and breaks the strata above, up to the Elled coal, or from some other disturbing cause, and it is found necessary to work with lamps in this seam? Clanny lamps are used; no powder is used. The Elled seam is little worked in this part of the mine, owing to its being thin and faulty. The Big seam is generally worked first; where both coals are workable, this is said not to injure the Elled coal above. The ventilation for these pits is produced by a furnace 7 1/2 feet wide, circulating 40,000 cubic feet per minute through the different seams and levels. The hauling underground is done at present by 47 horses, but engine-power is intended to displace horses to some extent. The quantity of coal drawn at Cwm Sychan pits is about 550 tons daily; this is sent down from the pits by a self-acting incline, 300 yards long, having a 5-ft. horizontal sheave at top; the iron wire-rope is 3/4 in., and is crossed by passing over two smaller sheaves. Another self-acting incline from thence, 800 yards long, lands the coal in the upper yard; nine trams are run each journey; the sheave and rope for this is similar to the first incline. The trams are open-bodied iron ones, with 18-in. flange wheels, running on 20-lbs. single head rails; gauge of road, 2 feet 6 inches.

OTHER COAL AND MINE PITS.—The Big pit near the iron works has been in operation upwards of 40 years, and is now stopped. The Bottom Vein mine, the Meadow, and other coals were got from it. Cwm Burgwm oval balance pit raises black pins mine 30 tons per day. Depth 104 yards, three-linked chain used, 1-in. balance-chain underneath. Cwm Burgwm pits, partly sunk and stopped, two oval pits, one for double band and pumps; a 22-in. beam-engine, on second motion, is erected, and intended for winding and pumping together—winds with flat wire-ropes. A level on the Red Ash seam is near these pits, not worked; the water running from the level supplies the balance pit. Gelly-nawsaid and Peter's pits, about 50 yards apart, a winding-engine between, of 21-in. horizontal cylinder, second motion, with rope-rolls for flat wire-ropes for the respective depths of 60 and 130 yards. The Gelly-nawsaid pit is 60 yards deep, and about 12 tons raised per day of the Spotted Mine. The Peter's pit is used as an upcast for part of Cwm-nantddu Colliery—no mineral is drawn at present; a pumping-engine is established at the top, 22-in. cylinder (beam), second motion, pumps by means of bell-crank, long connecting-rod, and T-bob. Depth of pit 130 yards, but the set of pumps is 70 yards, 9-in. bucket; an offtake adit is made 60 yards from the top. The whole of these engines, working with second motion, have the toothed-wheels, rope-rolls, and ropes outside the house.

CWM NANTDDU COLLIERY.—Two miles from Abersychan; two oval pits, one pit 238 yards deep, raise the Bottom Mine and Meadow coal; winding-engine, one 25-in. horizontal cylinder, 4-ft. stroke, direct-action. The other engine has a 25-in. vertical cylinder, 4-ft. stroke, direct-action, and draws water by tubs from the depth of 231 yards, day and night. A balance-pit near the above, where the Red Ash coal is raised from the depth of 71 yards. Two pits at Greenland, in the same district; one 22-in. cylinder beam-engine, 5-ft. stroke, second-motion; one band in each pit, 129 and 133 yards, respectively, raises the Meadow coal; winds and pumps together.

PRINCIPAL SEAMS OF COAL AND MINE FOUND AT ABERSYCHAN. 1.-Red ash, or Cwm Tillery Seam... 0 3 10. 2.-Soap seam, inferior coal... 0 2 9. 3.-Elled seam... 0 3 6. 4.-Big seam... 0 3 0. 5.-Three-quarter seam... 0 3 6. 6.-Rock seam... 0 2 0. 7.-Yard seam... 0 3 0. 8.-Meadow seam... 0 6 0. 9.-Old coal seam... 0 2 9. Bottom Vein mine... 0 10. [NOTE.—The Mynyddyslen seam is 200 yards above the Red Ash seam; Penant rock principally between them.]

Oct. 19. M. B. GARDNER.

NOVA SCOTIA GOLD FIELDS. SIR.—Your occasional comments upon Nova Scotia are beginning to direct the attention of European investors towards this long-neglected region, and enquiries have been made whether gold mining is really profitable here. It is only during the past three or four years that the business has been practised with any method, a majority of those who became interested preferring to extract gold from credulous buyers of land or shares to the more tedious process of extracting the native metal from its encasing rock; but the following items will, perhaps, supply the information desired.

The OPHIR MINE, at Renfrew, in three years, ending July, 1869, cleared 30,000l. profit, paying for its own purchase 12,000l. It produced 14,500 ozs. within the above period.

The WELLINGTON MINE, at Sherbrooke, in thirty months, ending last August, produced 27,000l. worth of gold, at a cost, including the mine, of only 22,000l.

The PALMERSTON MINE, also at Sherbrooke, yielded within the same period 20,000l., and paid its own cost and a dividend of 25 per cent. within the first year.

The PROVINCIAL MINE, at Wine Harbour, gave 30,000l. from 300 ft. of lead, worked only to a moderate depth.

The BURKNER MINE, at Waverley, in 1865 gave 35,000l., from 750 ft. of lead. The profit was 16,000l., and might have been doubled through better economy, and a check upon gold stealing.

The mine at Oldham, owned by the Boston and Nova Scotia Company, yielded 6000l. in as many months.

These are facts which have been officially attested, as mine owners have to swear to the produce when paying royalty. The three first-named properties are still productive, the latter has been closed on account of chicanery and litigation, and the rest being somewhat impoverished, are lying fallow for the present.

Of current news, the following may have interest in England:—SHERBROOKE.—Prof. H. Y. Hind has nearly completed the geological survey, upon which he has been engaged since June, and his report on this district may be looked for in December or January next. Developers here are limited to the Palmerston, Dominion, Wellington, Meridian, and Wentworth properties.

TANGIER.—The Burlington Company have started their mill, and had ready for crushing at the beginning of the week about 100 tons of ore from the Nigger and Leary leads.

MUSQUODOBOIT.—A spasmodic excitement was created in town

last week by the exhibition of some rich specimens from a new 5-in. lead found on the Touquey claims during the proprietor's absence at Gold River. The discoverers obtained as reward the right to work 60 feet in length with six men during three months, and the concession has since been bought by Mr. Burkner. The miners talk of 20 to 30 ozs., and even interested judges expect at least 10 ozs. to the ton. Mr. Burkner's Mine continues to produce well. A lot of 102 tons, from No. 4 shaft, where the lead is 6 ft. wide, gave 32 ozs. 2 dwts. The last crushing from the new lead will be completed to-day, and an average of 2 ozs. per ton is the estimated yield.

UNIAKKE.—The Westlake Company started work last month, under the superintendence of Mr. P. S. Hamilton, Ex-Commissioner of Mines, and have commenced crushing. The results are not known yet. The Uniacke Company struck a new gold shoot on No. 3 lode, to the east. The Montreal, Central, and Prince of Wales are the only properties now being worked.

OLDHAM.—Though operations continue limited, the results from this district are very encouraging, and attest the future importance of this district. The Sterling Company are still the principal producers. No reports to hand from the other districts. ACADIENSIS. Halifax, Nova Scotia, Oct. 8.

MINERAL WEALTH OF SPAIN.

SIR.—Much has been written in your valuable Journal, by able and well-informed correspondents, on the mineral wealth of Portugal, and there is, no doubt, much truth in what has been stated on the subject. I have resided in Portugal for some time, and, having made official examinations in many districts, can bear witness to its mineral importance in many parts of the country, which would pay for an investigation; but, at the same time, whilst giving that country its just due, it is really surprising that very little, if anything, has been written respecting the mineral wealth of Spain. Mining speculators and capitalists generally seem to ignore the existence of that beautiful country: why this should be is almost incomprehensible, for be it known that the mineral wealth of Spain is enormous, and in many provinces completely in a virgin state, only awaiting energy and capital to work out splendid fortunes.

I have long been acquainted with one locality in the province of Estramadura, near to the Sierra San Pedro, where the peasants of the adjacent villages earn a respectable living by washing the sand that contains grains of gold from a small stream of water running near to the villages, with no other apparatus than small hair-sieves. Now, there can be no doubt that the small grains of gold are washed down from the mountain, during the time of the heavy rains, from the gold quartz or other deposits; therefore, taking into consideration what is being done on such a small scale, with such primitive appliances, what could be achieved if worked on a large scale, with sufficient capital and proper modern apparatus to properly develop such a mine of wealth?

There is also immense wealth in the rich silver-lead ores in this same province of Estramadura, near to the town of Truxillo, where has recently been discovered a lode of silver-lead, yielding about 40 ozs. of silver to the ton of lead, and now being worked by a small Spanish company, but who, not having sufficient capital to properly lay open the mine, will be compelled to abandon it to some more enterprising adventurers. There are others in like abundance in the same locality unexplored, also indications of some of very ancient date. There is abundance of evidence in many parts of Spain, particularly in the province of Estramadura, that mining operations have been carried on with great success; the large quantity of scoria shows the immense amount of ore extracted. But I am of the same opinion as your able correspondent, Mr. E. Heydelbach Davis, writing about the mineral wealth of Portugal, that the ancient mines were not originally worked by the Romans, but by the natives, who paid tribute to their Roman conquerors in gold, silver, lead, tin, copper, and iron. I have come to this conclusion from having had access to some of the ancient archives from the time of the residence of the Moors in Spain, for something similar passed from the Spaniards to the Moors during the time of the latter's occupation of the country, for there is abundant evidence that the mines were worked by serfs, remunerated with little bread and any quantity of whip. Hence the inexpensive but clumsy way by which the metals were extracted; for many of the heaps of ancient scoria which I have examined upon analysis have discovered sufficient traces of copper and silver to pay amply for extraction, and would most certainly prove a very profitable undertaking.

In the same province, near to the town of Badajos, there are also quicksilver mines, with extracting furnaces erected, which have been in operation for a short period only, but now abandoned from want of capital. During the short time the works were in operation upwards of 6000 arobas of quicksilver of the finest quality was extracted; therefore, there can be no doubt that if some enterprising speculators, with sufficient capital, were to undertake the working of the mines they would find them of equal importance to the celebrated quicksilver mines of Almaden, which are now in full operation, yielding enormous profits. I have inspected both mines, and find in the Provincia such indications as fully verify this opinion. The whole district is impregnated with cinabrio, and nearly all the water that filters from the high lands and mountains is completely impregnated with the same. This branch of industry, like many others of equal importance, has been neglected in modern times, until within the last few years, and then only taken up by a few poor natives, without sufficient capital or practical intelligence to properly develop the mines.

There are also in the same province immense quantities of copper, manganese, antimony, sulphur, iron pyrites, with a mixture of copper, as also large quantities of good bituminous and anthracite coal; and some of the coal mines are worked to great advantage. Some of the outcrops on the mountains show good samples, and could be advantageously worked, with but little capital. Respecting iron, little has been done in that branch of industry, considering the immense quantities now discovered in the country, particularly magnetic iron ore, which would prove of equal importance in the manufacture of steel as the Swedish iron, particularly in the making of Bessemer steel. The most surprising thing is that none of our large English manufacturers have had their attention drawn to such valuable resources of mineral wealth, taking into consideration the great facilities the Spanish Government offers in the new mining laws, by which to any enterprising parties, foreign and native, particular inducements are held out to the capitalist for investment in the country. So anxious are the Government to have the mining wealth of the country properly developed, by proper persons, who would appreciate the new law of protection to foreign capitalists, under the very simple and cheap procedure for the acquisition of mineral property.

There are other sources of mineral wealth in that country of equal importance to the before mentioned—namely, phosphate of lime, the most valuable yet discovered in the known world, containing from 70 to 90 per cent. of phosphate. Thousands of tons have been exported from Spain to England and other parts, but not to the extent which such an important article demands, particularly when it is generally known that phosphate of lime is extensively used in the manufacture of artificial manures; and more surprising still when it is known that the Peruvian guano deposits are diminishing in quantity, and as a natural consequence will be more expensive; and at no great distance of time the British merchant will be completely shut out of the market, for, according to the latest Peruvian news, French capitalists are advancing money by way of loan to the Peruvian Government upon the security of the guano islands, thereby securing a complete monopoly to themselves by an immediate advance of price; and, notwithstanding which, the British merchant and capitalist, with the greatest persistence, continue to ignore the existence almost of this magnificent mine of wealth, where there are thousands of tons deposited by Nature, waiting only for capital and energy to produce a fortune for the adventurers.

There is generally a mistaken idea in England respecting Spain and the Spaniards. People here have an impression that there is no protection in that country for investments, for resident capitalists, or for manufacturers; but they should disabuse themselves of such an absurd idea. There is equally as much protection for the manufacturer and capitalist in Spain as there is in Portugal, or in any other country, England not excepted. I have had nearly 20 years' experience in Spain and Portugal, and have never experienced the slightest difficulty or want of protection, but always found the greatest encouragement, good treatment, and kind hospitality. True, there have been political commotions in the country, and no doubt the people, like our own in England, will continue to agitate until the present state of affairs is satisfactorily settled; however, taking into consideration the fearful state the country was in a few years

past, and the people only just emerging from semi-serfdom, and looking at the progress they have made in so short a time, we may fairly congratulate them on what they have accomplished.

There is another important feature in the affairs of Spain that should be taken into consideration. All newspaper accounts should be read with great caution, for nearly all of them that are sent to the English newspapers are exaggerated—sent by interested parties, in order to keep up the agitation, to damage the new prospects of the State, which is now doing its utmost to consolidate and firmly establish a permanent, good, and free Government. Manchester, Oct. 17. B. H. HOWARTH.

MINING INTERESTS OF COLORADO.

SIR.—Herewith I beg to give you some extracts from our last communications from Colorado, respecting mining matters. We have just received our first consignment of some 10 tons of silver ore from Colorado, from the Terrible Mine, situated near Georgetown, the preliminary assay of which by our brokers shows 40 per cent. of lead, and 496 ozs. of silver to the ton of crude ore, which will yield a profit, we expect, after payment of all expenses (mining included), of about 90¢ per ton. We have some 20 tons more from this mine now on the way, which will yield even larger results than this. WILLIAM COPE. Bartholomew House, Oct. 21.

Georgetown, Sept. 30.—There was a deposit yesterday at the First National Bank of some \$500 in gold, from the North Park Mines; it consisted of nuggets ranging in weight from \$1 up to \$20. Dr. Latham says that these mines have been worked for the last year and a half with good success; \$10 to \$15 a day to the man have been taken out; 4000 people, it is expected, will be engaged in working them next season. At the Colorado National Bank there were 13 bars of gold, value over \$12,000; about half of it was from the Cimarron Mines. One ton of ore from the Federal lode, close to Georgetown, was reduced last week, and yielded 1338 1/2 ozs. of silver; coin value, \$1740. The largest mass of silver bullion ever produced in the United States was sent off yesterday from here, to be exhibited at the fair now being held at Denver; it was from the Brown Company's Works, weighing 539 lbs. Troy, or 6169 ozs., value \$3385 in coin. The Amada lode, situated on Sherman Mountain, has been developed to some extent; an assay of lean quality rock from this mine yielded \$149 per ton of 2000 lbs.; and an assay made by Professor Burlington, of the Territorial Assay Office, of selected ore yielded \$2000 per ton of 2000 lbs. Last evening I saw several massive specimens of brittle silver from the Terrible Mine; this ore, I was informed by Mr. Clark, yields at the rate of \$26,000 per ton of 2000 lbs. Of course, these are exceptional and picked samples, but they are very remarkable, as showing, with the tons of ore I have shipped to you from this mine, what a wonderful rich property it is. Our coal is being rapidly developed at the fair now being held at Denver. Mr. J. M. Marshall shows a lump of excellent coal from his mine, on South Boulder, weighing 5000 lbs.; and Messrs. Lowe, of Green Mountain Coal Banks, announce that their mine is fully opened, and they are prepared to deliver at the mines 50 tons per day.—R. O. OLPE.

COLORADO, AND ITS MINERAL RESOURCES.

SIR.—I have just been taking a geological ramble over and across the rich undeveloped mountains and creeks of Colorado. Seven days' careful exploring, with my experience of mining in England, enables me to give what I believe will prove sound and reliable information on property, both in gold and silver, that would be a safe investment for capital. I was much surprised to find such rich lodes here not worked, and have oftentimes wondered why English capital has not been introduced into this country; but looking at the inconvenience until recently of getting here, that surprise was much lessened, the nearest railway station to the mines in Colorado being Cheyenne, 150 miles by stage coach; they are now laying the rails from Cheyenne to Golden City, and this line will be opened in about two months. Parties then can come by rail within a short distance of those mountains; it is expected when this line is opened it will call the attention of a great many mining gentlemen here. It is reported that some from London will pay us a visit, if so, they will never regret their trip across the Atlantic, as they will find, in my opinion, Colorado one of the richest fields for mining in the world. In my seven days' tour I found many very rich lodes, both in gold and silver, with little or nothing done in the way of developing them. I took top quartz from many of the lodes, which produced from 4 ozs. to 10 ozs. of gold to the ton of stuff. The lodes are from 1 ft. to 6 ft. wide. If there were stamp-mills erected to crush those ores, they would pay large profits at once. Silver lodes, producing from 60 ozs. to 700 ozs. of silver to the ton, near the surface, are in abundance. I saw one large lode, that crops up some feet above the surface, and can be traced for four miles in length. There is a shaft sunk on the course of this lode, about 100 ft. deep; in the bottom of the shaft the lode is from wall to wall over 20 feet. There are many small veins of silver ore in the lode, from 1 in. to 4 in. wide, and making into one altogether, as they run down. This lode is out through at the bottom of the shaft; a quantity of the stuff is now at the top of the shaft. I took a sample of the ore as it was broken, which produced 60 ozs. of silver to the ton; had those ores been dressed the same as they dress their ores in England they would be of a much higher percentage, but dressing of ores is quite out of the question here, although there is ample supply of water near the shaft for dressing purposes. The shaft was sunk by labouring men, who had not the means or skill in dressing ores, or putting in the dressing-floors. There is not a dressing-floor in these mountains. The ore is sent to the smelter, and sold as it is broken in the mine. Many other silver lodes I saw, with little or nothing done on them, some with pits sunk from 10 to 30 and 50 ft. deep, rich in silver, producing from 200 to 700 ozs. per ton. Nothing doing on them, on account of being inconvenient of roads, which could be made at a small cost. Copper ores are here in any amount, and of the best quality, grey, black, yellow, peacock, malleable, and malachite, but they are not taken the least account of, no more than if it were sand. The mines here are paying well, but they are not worked by companies—they are opened and worked by one or two men. I hope the time will soon come when we shall see some English capitalists start a mining enterprise here, to show them how to mine. I hope in a few days to send to the Journal a full account of what the mines here at work are doing weekly. Central City, Colorado, Sept. 15. J. MINERS.

THE NEW QUEBRADA COMPANY.

SIR.—I shall be glad to be allowed to make some remarks about this company, whose meeting takes place next week. That meeting will be a most important one; and, if it passes over well, and without those disturbances which last year so nearly ruined the company, it will, I believe, be the commencement of a period of prosperity of a very unusual kind, for there can be no question but that the company possesses elements of splendid success, if only they can be developed. It will be remembered that the present board of directors was elected last year, in pursuance of the unanimous recommendation of a committee of shareholders appointed specially for that purpose, and as the only means of saving the company from the anarchy and ruin which was then close at hand. Five of them were new men, and they were chosen from all classes and localities. The sixth was Colonel Strange, a member of the old board, whose personal qualities and character, and practical personal knowledge of the property and the mines constituted so strong a recommendation that the committee felt bound to include him. They would also have gladly included Mr. Salmon, but his health made him unequal to the task (for task it was, and still is), and he declined it. Now, what has this new board done? Has it established a claim to our confidence or not? I say unhesitatingly (and I know as much of the affairs of the company as most men) that it has; and that unless, as a general principle, we continue our support to them we shall be the most arrant set of noodles who ever earned and deserved ruin. What have they done towards settling our affairs? 1.—They have at last, and after all the delays which interested duplicity could cause, and legal subtlety raise, got us an estate; and the conveyance is signed and sealed, and the papers, &c., duly handed over. No one who is not conversant with such matters can appreciate the difficulties which have had to be met and got over in order to effect this great object. But, thank goodness, it is effected, and the great estate of 250,000 acres is now our own, hard and fast—mines, wood land, and all. We can now freely deal with it, and have something to go into the money market with, if necessary. If the new board had done nothing else but this one thing they would have gained a good ground for our confidence.

2.—They have developed to some extent some of the products of the estate other than minerals, as far as the small capital at their disposal enabled them to do. I believe this has been done with success—that is, has realised a profit of (say) 20 per cent. on the capital employed. Not that it amounts to any great source of profit, but it will pay half a year's office expenses—better than nothing; and if it can

be repeated four or five times a year it would come to something considerable, and worth taking into account.

3.—The difficulties with our late contractors, which were disagreeable enough last year, as there was a looming in the distance of what we all hate—more law—are now virtually at an end, and have ceased to be serious; and the determination shown by the new board to resist to the uttermost has powerfully contributed to this good result.

4.—They have after much trouble got so far into the question of getting us to the mines—the great object of the company, and which when effected will make our shares realise a high premium, as to be able to lay a definite proposition before us with really responsible contractors.

5.—They have reduced our expenses as much as they possibly could, for, of course, no company like ours can be worked for nothing. Well, I say that these considerations form a legitimate ground for confidence in them; and more than that, for a vote of thanks to them for the attention they have paid to our affairs, coming up at their own expense, as they have done, from Manchester (Mr. Pyne), from Birmingham (Mr. Charlton), from Guildford (Mr. Smallpiece), and elsewhere, to attend the very frequent meetings which the difficulty of our affairs has rendered necessary. And remember none of them are jobbers in shares or speculators. They are all holders, and their interest in the company is a *bona fide* and an honest one, with no indirect connection with any other source of profit which their seat at the board might subservise. I, therefore, assert that the present board of our company may fairly challenge comparison with any similar board I am acquainted with, and I give this opinion as an independent man, who has looked pretty closely into the matter.

If the shareholders are wise, therefore, they will steadily support them, unless something new arises quite opposed to what we have already seen. But shareholders are often so led away by a plausible speech as to reverse, in a moment of folly, the policy of a year, like fox hounds, who leave the true scent to follow the trail of a herring. Of course, I do not mean to say that the directors are all Popes—that in every respect they are infallible—but I do say that as they have, by their conduct of the last year, established a solid ground for our confidence, we should continue that confidence to them, and give them our support where they ask for it. And in filling up vacancies in the board, we should abstain from supporting those whose presence there would be a source of annoyance or quarrel, and, consequently, of injury to our interests. Where men sit pleasantly, and yet quite independently, together, more and better business is done than where they are striving for the mastery, and pertinaciously opposing one another. The end of that sort of thing is generally bad. Men with crotchets, too, are great stop-gaps. The confounded crotchet is always coming in *apropos* of nothing at all, and you can neither get on with it nor without it. Let us have nothing to do with such, they are as bad as quacks.

I feel convinced that the present is a highly important period in the Quebrada affairs. For the first time we are on solid ground—the estate is our own; and for the first time we see blue sky in the distance. It would be a thousand pities if, now we are going steadily in that direction, we should suddenly throw our officers overboard, and change the course for one in the opposite direction. I can hardly think the shareholders will be so foolish as to do so, yet I have seen such things done; and, therefore, I write this letter, seriously asking them to consider very carefully before adopting any course antagonistic to that board which was carefully selected and elected only last year, and has since so wisely and prudently administered our affairs, and which, in my humble opinion, well deserves our thanks and confidence.—Oct. 19. A HOLDER OF 200 SHARES.

LEGITIMATE MINING.

SIR,—The responsibility of recommending is something to be avowed, not to be concealed. When assumed, a man's practical, professional judgment is involved, which, proving to be misleading, it will not be again lightly trusted in by those deceived with it, but which, proving right, a sort of prestige is established. On the other hand, when the responsibility of recommending cannot be laid at any man's door, and particularly at a solvent man's door, miscarriage bears the ugly name of taking in, while success neither rewards with mining honours the broker nor adventurer. And there is this further to be said, that in coming frankly before the public—showing one's hand, and speaking out—the public at all times would be disposed to deal generously with one whose judgment only was at fault—with one whose conscientiousness was not to be impugned. Besides, who will deny that if ever the public deserved candour it is at present. Around them there is a wreck of everything—wreck of business, wreck of character. Whom and what to trust are the questions of the time. Nor is it to be denied that with many there always has been a prejudice against mines. They have heard them harshly spoken of; they may have had their fingers bitten; or, last, they may have noticed that often mining enterprise takes one of two forms—first, irresponsible promotion; or, secondly, large hauls to brokers or adventurers. These remarks will serve for preface to the frank recommendation of one of the most promising mining properties that ever has been put upon the market. The property, moreover, is at home—neither in Spain nor Germany, neither at the Cape nor Australia, neither in North nor South America. A few hours ride on the Great Western Railway will set the buyer beside it, in one of the pleasant parishes of Cardiganshire.

The property (the NANTEOS CONSOLS) has several points that will favourably impress the unprofessional. In the first place, there is a property—a mine; in fact, three mines. Beyond all question, this is a fact, one attested to by Capt. Michael Barbary, a manager of lead mines for 20 years in Cardigan. And Mr. Michael Barbary's testimony is itself attested to by the well-known endorsement of the first mining authorities of the country. Further evidence of existence is furnished in these words from the new Articles of Association:—

"Whereas a company, formed under the Cost-book System, with 12,000 shares, under the style or title of the NANTEOS CONSOLIDATED MINES, has for some time past been working mines, or carrying on and exercising mining operations and rights, within, over, upon, and under certain defined mineral sets, known as the NANTEOS AND PENRHUW MINES, situate in the parish of Llanabarfuraf, in the county of Cardigan; and whereas at a meeting of the adventurers in the said Nanteos Consolidated Mines, held at the mines on the 10th day of August, 1869, it was resolved that the Nanteos Consolidated Mines be re-constituted as a company with limited liability, in 12,000 shares, of £1 each, and that 6000 of such £1 shares, fully paid-up, be allotted to the then present shareholders, in proportion to their respective interests in the said Nanteos Consolidated Mines, as the price or purchase-money."

Therefore, no reasonable doubt is to be entertained of the existence of the property. It is something to be seen, as distinguished from property in imagination. It, moreover, has been acquired on fair business terms, and of its condition and prospects there will be something to be said further on.

In the second place, the property is dry, not wet. As one consequence, the miners are not at times drowned out, and their reproductive labour stopped. As another consequence, there are neither present nor immediately prospective outlays for costly pumping-engines. To the depth of 70 fathoms adits have been driven, which carry off the water. The importance of this consideration needs no elaboration. It may be remarked, however, that in a period of depressed trade, and consequent low market price of minerals, the working or closing of a mine may turn on the unwatering. At such a time a dry mine may be profitably kept going, while a wet mine, burdened with costly pumping-engines, must be closed. Again, in opening ground, going on or stopping may frequently turn on the unwatering—that is to say, a working capital which would have served to open up a dry mine, would prove insufficient to open up a wet one. The Nanteos Consols are without the encumbrance, and, in respect to capital, without the dead weight of pumps.

In the third place, the dry property is worked by inexpensive water-power. The paradox is easily explained. The drainage of the property is to a valley at one level—at a low level. On the other hand, the drawing and crushing is by water-power from another valley at a different level—at a high level. Such is the explanation. At a suitable elevation there is superabundant reservoir storage, and a never-failing supply of water, which, turned on the great water-wheel, gives all the motive-power needed, or that is ever likely to be needed. The waste water from the wheel seeks the lower valley, and so does the drainage of the workings from the 70 fm. level adits. Rare combination of natural advantages—mining under conditions seldom heard of. The minimum of dead-weight outlay—the probability, if not the certainty, of being able to work successfully at a lower market price

for lead than ever has been touched, or than is ever likely to be touched.

So much for the points that will favourably impress the unprofessional. The others still to be named are deserving of the attention of those who are acquainted with mines. The mines, three in number—the Nanteos, the Penrhwi, and the Blwch Gwyn—are in one run, with five lodes opened, which are all productive. One yields as much as 3 to 4 tons of lead ore to the fathom; the others at shallow depths, 1 ton each to the fathom. But in matters of detail Capt. Michael Barbary may as well be heard, and here is an abridgment of his excellent report:—

"In the Penrhwi, or western part of these mines, the 26 fm. level has been extended 68 fms. west of engine-shaft, and for the last 8 or 10 fms. has passed through a very productive lode, yielding on an average about 2 tons of lead and ½ ton of blende per fathom. The lode in the present end is 6 ft. wide, still yielding the above-named quantity of ores, and is being driven for 41. 10s. per fathom. The whole of the ore ground above and below this level can be shortly removed at from 30s. to 40s. per fathom. About 30 fathoms ahead of the present end there is a valuable course of ore in the bottom of the 16 fm. level; there is also a good course of lead ore further east in the 26 fm. level, and should the 26 fm. level continue to go west as good as at present going in that direction it may be calculated that every fathom driven is laying open about 3000. worth of ore, but to make a distinct calculation more ground must be laid open, and that must be done by driving more levels. Considering only one level is being driven, and that very profitable, it would not be too much to expect that, on continuing the levels above and below the present ore ground at the 26, there will be found a highly productive mine in this part of the set-allow. This can be done down to the 46 fm. level without the aid of any pumping machinery. At this part of the mine at surface there is a large and powerful water-wheel, with drawing machine attached, and about 30 tons of lead and a similar quantity of blende ores. As soon as a crusher is erected, which will cost about 3000. I should calculate the returns from this part at 25 tons of lead and 10 tons of blende per month, reckoning, of course, only the present limited working. At the eastern, or Blwch Gwyn, part of the mine there is as splendid a looking lode as ever I saw at so shallow a depth (5 fms. from surface); it is composed of first quality gossan, friable quartz, blende, and lead ores, yielding of the latter about 1 ton per fathom. There are some old workings on two side lodes, showing a very fine blende appearance, and the Penrhwi lode has also been partially worked heretofore. From what I can see of these lodes, there are traces of very profitable working to a depth of a few fathoms, and I have no doubt, from the presence of lead ore in every direction, that it is only to open up these lodes to realise handsome profits from their development. There are, in all, five champion lodes traversing this property, all of which present the most favourable appearances, and can be wrought without the aid of pumping machinery to a depth of 70 fms. from surface. On the eastern part of the mine at surface there are crusher-houses, wheel-pits, buildings, &c. and some good piles of lead ore in addition to that broken underground. The advantages possessed by these mines in buildings, reservoirs, roads, &c., cannot be too highly valued, and I have no hesitation in saying they will be sure to result in a permanently profitable undertaking, if carried out in a judicious and energetic manner."

One point remains—the management. This as it should be all will be well; but otherwise ever so good a property will prove a disappointment. So far, it is the intention of those now interested to apply the new capital to the early active development of the property. So far the original adventurers may be trusted, their interests, and those of the new investors being the same. They take nothing from the property by the transfer, and in future have nothing to receive from it unless the new capital is properly applied. And with them the new investors will share equally in the administration, electing the directors and other officers. Hitch or mischance seems impossible; and that cautious investors may not be deterred from coming forward, the now usual expedient has been resorted to of preparing scrip warrants to bearer, the bearer being the investor, and no one's name appearing in the books. Whatever additional information may be wished I shall gladly furnish; and, in conclusion, I would state that since the prospectus and report were published a 40-ft. water-wheel and two powerful crushers have been purchased, and are now at the mines. I apologise for the length of this communication.

3, Great St Helens, E.C., Oct. 20. CHARLES THOMAS.

THE VIRTUOUS LADY MINE.

SIR,—My attention was attracted to this mine by frequent references to it in the Journal. It appeared to me that if only a portion of what was stated could be proved to be true, it must be in reality a valuable property. Accordingly I paid a visit to it, with a view to test the statements made by its promoters, and altogether unconnected with it either as promoter, shareholder, or by acquaintance with those who have been the means of placing it before the public. I had made enquiry of some of those gentlemen with whom I had had business in shares in other mines, but found everyone ignorant of anything relating to the Virtuous Lady, and even in Tavistock I could only learn that the country of the Virtuous Lady Mine was of the most picturesque and grand in its scenery to be found in the county of Devon, but the mine and its character were alike unknown to the present generation.

I determined to satisfy myself. On approaching the sett, which I did by passing over what I believe is called Roberough Down, in the parish of Buckland Monachorum, I was much struck by the peculiar forms and mineralised character of the strata, no less than by the extreme and romantic beauty of the locality. The sett is a very large one, washed on two sides by the Rivers Walkham and Tavy, which unite near the angle of the hill or down, called the Virtuous Lady, and the view, at once extensive and pleasing, has for its most remarkable object on the further side of the Tavy a strikingly metallic looking hill, called Huel, or Wheel, Bedford. This hill, I was told, was known to be very rich in mineral, but has not been worked. From the higher waters of the Walkham a lead or launder has been carried round the brow of the hill, from which the power to work the Virtuous Lady Mine is obtained. The water-wheel was in course of erection, and by this time is at work unwatering the mine. The water power is practically inexhaustible, and at such an elevation as to admit of half-a-dozen wheels being erected, if necessary, for the work of the mine. Great command of power at small outlay, and little more than nominal cost for working, is thus upon the property, and, I was told, formed part of the lease granted by Sir Massey Lopes, Bart., M.P.

On descending to where numerous millwrights and others were at work, I found concealed by the angle of the ground the evidences of a considerable establishment, consisting of miners' cottages, smiths' shop, counting-house, captain's house, stables, &c., and men busy in various ways, under the orders of Capt. H. Horswill, clearing out the old and erecting new works for the mining operations about to be undertaken by the newly-formed company. On enquiry, I found the mine had been privately worked some 12 or 15 years ago, but that since the death of the then captain, who was also the holder of 13-14ths of the concern, nothing had been done, and the property, like many others, lay without any attempt being made to extract the riches which all declared were known to be in the sett. It was asserted that Capt. Williams began his operations a poor man, and died leaving behind him 100,000. On entering the "caverns," and hence into the levels, which were accessible above the water-line, I found indications of mineral riches in no niggard quantity; in fact, I was astonished to find on every side and around the most varied and extensive mineralised rocks, and I do not think any miner can enter these levels without being impressed with the wonderful riches which everywhere abound. I could only descend about 9 fms., although I understand the old workings had extended to 17 fms.; but the most beautiful rich gossans, friable prian, and mundaie were openly to be seen, with every-where indications of other minerals laid open to inspection. Of yellow copper ore, I was informed, as many as five distinct lodes were already discovered, besides lodes of black copper, to be followed downward immediately the unwatering of the mine admits of operations being proceeded with below. There are also believed to be several lodes not yet opened on, and from a winze sunk in one of the levels the near proximity of one of the "flats" of copper known to be in the sett is indicated, so that the parties interested really look forward to a great mine at a very early period. The following features are to my mind worthy of notice:—The cost of working this mine must be small, because a large amount of dead work is already done; the quartz rock is firm, so that no timber will be needed; and the mineral wealth of the mine appears so near the surface, and so within reach, that the cost for labour must be very little more than the cost of open quarry work, while the great water-power on the property admits of accomplishing anything that can be required, even if the shaft were ten times the depth it is now; and the sett is extensive enough to employ 1000 hands for the term of the lease at least—21 years.

I think I am discharging a duty to many who, like myself, take great interest in mining, without professing to have technical mining knowledge, to call the attention of your readers to this property. Since my inspection I have taken an interest in this undertaking, as also have some of my friends, and believe I have connected myself with a genuine mining undertaking, from which I fully anticipate

the most successful results at an early date. I am not a promoter nor agent, and write only in the interest of those who may be looking for a fairly promising investment. If you will kindly take the trouble to give my private address, which I enclose to you, to any gentleman wishing for further information, I will be happy to answer by letter any questions in my power to aid them in coming to a decision as to the prospects and character of the Virtuous Lady Mine. As respects the statements of the promoters, your own columns furnish these. I believe fully what I have written, and am of opinion I have made a good—

INVESTMENT.
P.S.—I may state that I adopted the plan of making a personal inspection of the Virtuous Lady Mine, rather than of depending upon the opinion either of promoters or dealers in shares, because my experience in other undertakings has taught me how little one can depend on statements put forth by these classes, however much they may profess to know.

VIRTUOUS LADY MINE.

SIR,—About two months since I visited this mine, and was much pleased with the appearance and prospects of this well-known valuable mining property. On Saturday last I paid another visit, and found that a water-wheel had been erected, with rods, bobs, and pit-work. It was put in motion about three o'clock, and worked in a very satisfactory manner, forking the water in a way that reflected great credit on the engineer, agent, and men. Several mine agents and adventurers were present; the wheel was named "Barnard's Wheel of Fortune" by one of the adventurers, who, in an eloquent speech, eulogised the secretary, Mr. Barnard, for the very energetic manner in which he had formed the company to work the mine. After this, the whole of the miners were bountifully supplied with the old English fare of beef and plum pudding, and I never witnessed a more pleasing sight. Several toasts were given by the agents and others, who expressed themselves highly pleased with the rapid progress which had been made. It was the belief of all present that when the mine was in fork (which will be in about one month) many rich and valuable courses of ore would be met with, and several tribute pitches would at once be set at a price that will leave large profits to the adventurers. The adventurers will soon be repaid for their outlay, and this will stimulate many other mines to work in the same spirited manner as the Virtuous Lady Mine, and I hope with the same chances of success.

Tavistock, Oct. 18.

VIRTUOUS LADY MINE.

SIR,—He who makes two blades of grass grow where only one grew before, is called a benefactor to mankind. In a far more exalted sense is that man a benefactor to the world who creates "real wealth," by giving profitable employment to working miners, thereby enabling them to taste a little of the "beef" from the bullock that fed on the blades of grass. Such a man, such a benefactor, is the secretary of the Virtuous Lady Mine, in his intelligent and energetic re-working of this valuable property—giving, on the one hand, employment to many able miners, and on the other working an adventure that is sure to turn out a splendid success to every shareholder.

The management of this property is in the hands of honest practical men, who are pledged to economy. The proprietors are intent on working the mine legitimately, and have a large paid-up capital at their service. The water-wheel is working famously, and the mine will soon be in fork. The machinery is in first-class order, and all necessary buildings erected. Several rich lodes containing copper and silver are already discovered, and no one can visit the mine without having his faith sensibly increased in the success and future riches of the Virtuous Lady. PRACTICAL MINER.

CALLINGTON MINING DISTRICT.

SIR,—Having paid a recent visit to this district, I was gratified to observe the enlivening proceedings and successful re-working of Kelly Bray and Holmbush Mines, and the great promise of success of other mines in the district; and my special attention was called to a new mine, with rather an unusual name, called the Excelsior, on which, after making a careful survey of the sett and the workings therein, I beg to make a few remarks.

This mine is situated in the parish of Stokcolmsland, in the Duchy of Cornwall, in a line a little south-east of the great Holmbush Mine, and possesses one of the principal lodes—the Flap Jack lode (a caunter), which is in the south part of the Excelsior sett, the other lode of Holmbush being north of the sett. By my observations, the Excelsior contains four or more lodes running in an east and west direction, full 500 fms. through the sett. In order to prove those lodes by economical operations, a deep adit is commenced within about 50 fms. of the north boundary, and by being continued in a south-west direction will intersect four lodes before the south boundary of the sett is reached, at which point the adit will be about 50 fms. in depth from surface. I cannot, at present, definitively describe at what points of driving the adit will intersect the several lodes; but at 100 fms. driving it will intersect a fine east and west lode, the discovery of which is by sinking a shaft from surface about 8 fms. deep; the lode is from 4 to 8 ft. wide, producing an abundance of gossan of the best description, equal to any discovery in the district. At the intersection of this lode by the adit level it will be 30 fms. from surface; therefore, by driving east and west on the course of the lode at this depth I am strongly impressed that a quantity of copper ore will be raised therefrom. Continuing the adit south of this lode two other lodes will be intersected at an increased depth. My attention was also called to remote workings on the backs of these lodes, which were evidently productive of tin; and since my visit to these workings a very experienced tin-dresser has paid a visit to the mine, and taken samples from four workings, and from his report (which can be relied on) the waste or refuse of four lodes will pay all expenses of stamping, dressing, &c., and leave a remunerative profit for any outlay made thereon. Under these circumstances, and from my own observation, I can with propriety recommend the Excelsior sett to the speculator as a safe investment. The adit should be driven in a direction south at least 150 fms.; the present progress of driving is rapid and inexpensive. The adit is extended 15 fms., and the present price for driving is 30s. per fathom; however, to meet all contingencies, I consider that from 8000. to 10000. may be required to complete the adit the length I recommended it to be driven; this being done, the position of the mine will be permanently established for further operations. The adit giving such facility to explore four or more lodes east and west through the sett at this level will enable the shareholders to judiciously select the best position to erect any machinery that may be required to carry out the works on an extensive scale. JONATHAN DAVEY, Mine and General Surveyor.

Alma Cottage, Gunnislake, Oct. 16.

MINING—DOES IT PAY?

SIR,—I have read with interest Mr. Pike's letter under the above heading, contained in last week's Journal. Will you kindly allow me to give a practical illustration of the excellence of mining as an investment, drawn from my own experience? I am one of a very numerous class of persons, professional men who have but a limited amount of surplus cash over and above their necessary expenditure, naturally wish to lay it out to the best advantage compatible with the security of the money invested. Regarding myself as a fair specimen of this class, let me now state my own case as an average instance of what may be done by investing in mines, if only people will exercise due care and avoid rash speculation. During the last few months I have from time to time invested surplus money to the extent of a few hundred pounds in mining shares. What has been the result? Three old-established dividend-paying mines yield me, with the utmost regularity, interest varying, from 11½ to 16½ per cent. on the money invested. Nor is this all. The advantage is increased by the shortness of the intervals (only two or three months) between successive dividends. Add to this that my original capital has been increased some 40% or 50% by a rise in the market value of the shares of all three of the mines in which I have invested. I think then I have a right to speak well of mining adventures, and to recommend them to others. I purposely refrain from mentioning any particular mines; there are several in your weekly Dividend List of such a permanent character that no one need hesitate to buy the shares. Progressive mine shares should only be bought with the fullest and most reliable information about their position and prospects, otherwise loss will probably ensue, which will very naturally, though very unreasonably, create a prejudice against all mining investments. A FRIEND TO MINING.

[P.S.—I enclose my card for your satisfaction.]

[For remainder of Original Correspondence, see this day's Journal.]